

Solidifying the EU's leadership in the global energy transition

Introduction

The Energy Transitions Commission (ETC) is a global coalition of leaders from across the energy landscape, committed to achieving net-zero emissions by mid-century. We provide practical guidance and recommendations to policymakers, businesses, and stakeholders to support the transition to a low-carbon economy, which we believe can unlock new economic opportunities and drive sustainable growth. With ten regional programs,¹ we track the progress of energy transitions worldwide, giving us a unique perspective on the challenges and opportunities in different regions.

As the European Commission prepares for a new five-year term, we present this note as a stocktake of current progress, alongside identifying further opportunities to solidify the European Union (EU)'s climate leadership through implementation across mostly existing policy packages. While the EU has made commendable strides in reducing emissions – notably through renewable energy and efficiency – there is still more to be done, with other key geographies such as China and the United States accelerating deployment still faster, and in some cases more comprehensively, through green industrial policy.

The coming months will be crucial in shaping the EU's next phase of climate action, and we hope to engage the Commission in considering these focus areas and enacting these recommendations to ensure the EU remains a leader in the global energy transition.²

This EU Policy Whitepaper therefore covers two areas:

A. A look-back at **state of the energy transition and implications for Europe**, covering in turn:

1. **EU accomplishments** within its energy transition to date.
2. **Looking forward**, the path to further EU progress on emissions reductions by sector.
3. **The state of the global transition** and how Europe compares.

B. **Key focus areas and recommendations for the next five-year agenda of the EU Commission**

1. **Hold the ground:** Avoid reversing previous policies to send clear market signals that will encourage investment and maintain momentum around the energy transition.
2. **Complete the picture:** Expand policy focus to areas beyond the power sector to ensure emissions reductions is achieved across all sectors.
3. **Realise competitive advantage:** Align industrial policy with environmental goals to ensure European companies can compete in the global marketplace.

A. State of the transition and implications for the EU

1. EU accomplishments within its energy transition to date

The EU has made remarkable progress in its energy transition to date, achieving significant decarbonisation milestones across several key areas.

Stocktake: Power generation from fossil fuels fell to a record low of 23%, driven in part by the Renewable Energy Directive (RED), which, after meeting its 2020 target of 20% renewable energy in final energy consumption, set an ambitious 2030 goal of 40%. Between 2017 and 2023, renewable energy installations in the EU grew steadily, with solar increasing by an average of 20% per year and wind by 10%. The REPowerEU initiative has further accelerated the shift away from Russian gas, reducing the EU's overall gas consumption by 18% and slashing the share of gas imports from Russia from 45% in 2021 to 15% in 2023. Although some of this reduction is due to a contraction in industrial demand, much of it reflects real progress in energy diversification, particularly in the power sector. In 2023, emissions were nearly 16% lower than in the previous year, bringing total emissions down 43% compared to 1990 levels. Per capita emissions are now just 5% above the global average and 40% below those of China, with CO₂ emissions from energy combustion falling by 9% in 2023, even as the economy grew by 0.7%.

A strong policy foundation: Current EU policies are likely to see an acceleration of current progress, meaning Europe's energy transition can set a powerful example for global decarbonisation efforts. The updated EU Emissions Trading System (ETS) target, revised in April 2023, aims to cut emissions by 62% by 2030 compared to 2005 levels, up from the previous goal of 43%. Rising carbon prices, having initially driven progress in the power sector, are pushing other industries to decarbonise, with the price of European Allowances (EUA) more than doubling, from around €30 per tCO₂ in 2021 to over €80 per tCO₂ in the past 18 months – levels at which decarbonisation in many industrial sectors becomes cost competitive. Additionally, the removal of freely allocated allowances from the ETS means that heavy industry in Europe will soon face material carbon prices for the first time, which should help accelerate decarbonisation efforts. The Carbon Border Adjustment Mechanism (CBAM) further supports this shift by taxing imports from sectors at risk of carbon leakage,^{3,4} thus levelling the playing field for European industries. While it is too early to see the full impact of the ETS and CBAM, their potential to drive investment in new decarbonisation technologies is clear, and early signs suggest they could spark a global ripple effect as other countries adopt carbon pricing mechanisms to retain revenue rather than pay into EU taxes (e.g., introduction of carbon pricing in Türkiye, likely in India).

¹ EU, China, Japan, Australia, Indonesia, US, Canada, Sub-Saharan Africa, India, Brazil.

² We limit our focus to the power, industry, buildings, and transport sectors and do not look at land-use or agriculture.

³ Carbon leakage can occur when production moves abroad (industries shift operations from areas with high carbon prices to those with low carbon prices) or when imports become more carbon intensive (lower-carbon domestic products are replaced by carbon-intensive imports).

⁴ The CBAM will initially apply to imports of certain goods and selected precursors whose production is carbon intensive and at most significant risk of carbon leakage: cement, iron and steel, aluminium, fertilisers, electricity and hydrogen. European Commission (2024), *Carbon Border Adjustment Mechanism: CBAM transitional phase (2023-2025)*, available at https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.

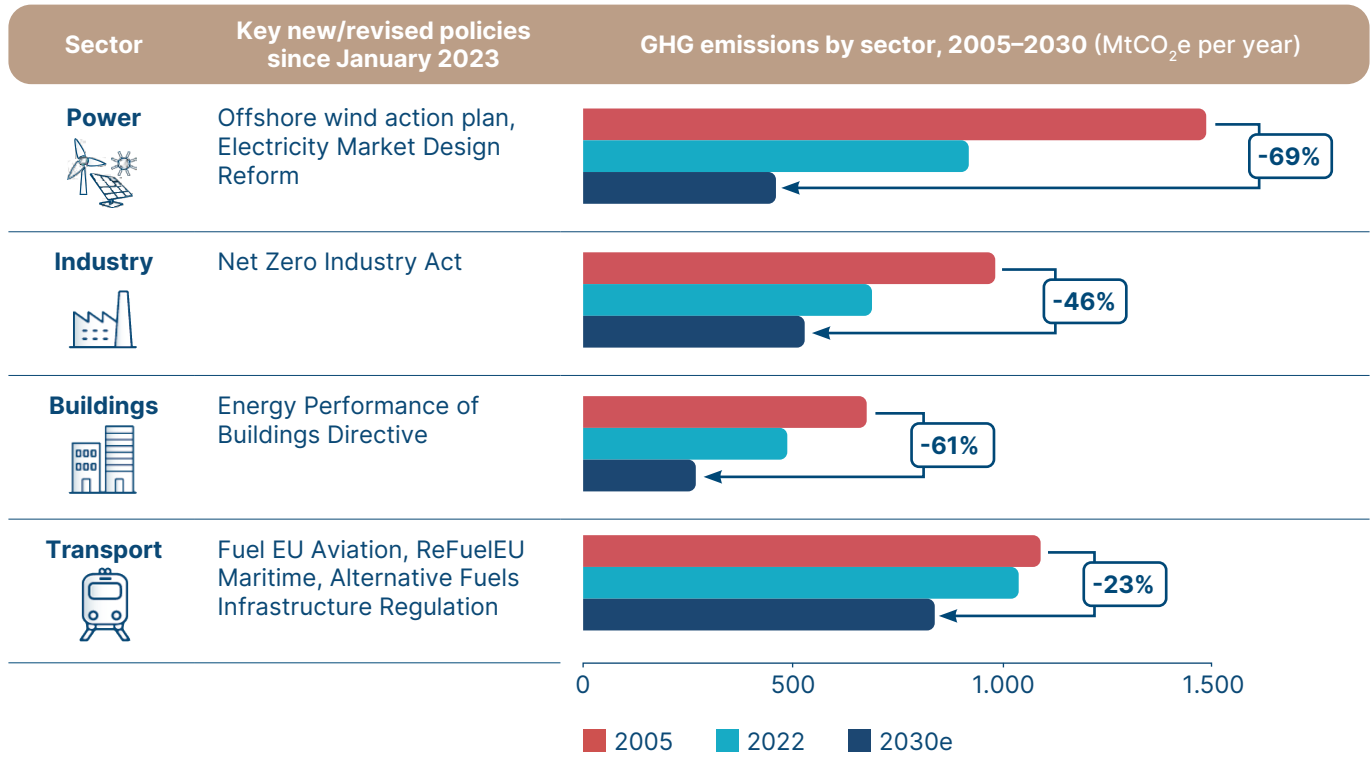


2. Looking forward: the path to further EU emissions reductions by sector

This drop in emissions has, however, largely been driven by efficiency gains (e.g., in vehicle fuel standards, appliances) and investments in low-carbon power generation, meaning more needs to be done to continue to grow clean electricity, while also focusing on accelerating emissions reductions in buildings, transport and industry [Exhibit 1]:

EU emissions (2005–2030) and key policies by sector

Exhibit 1



Note: 2030e (2030 estimates) refers to the 2030 “MIX 55” scenario from EEA, which is a policy scenario underpinning the 2030 Climate Target Plan. Source: European Environment Agency (2023), *Trends and Projections in Europe 2023*.



Power emissions have already decreased significantly (over 35% between 2005 and 2022), primarily driven by the installation of renewable generation and running fossil fuel generation more flexibly. The continued fall in global costs of solar, wind and batteries means emissions will continue to fall. But as variable wind and solar reach high shares within power systems this next phase of decarbonisation will be more complex, shifting focus away from generation to the integrated system (e.g., grids, interconnectors, storage). To ensure decarbonisation continues at pace, active removal of barriers will be key, such as: accelerating planning and permitting, building and optimising electricity networks, and ensuring European power markets are properly designed to “balance” systems with high shares of variable renewables.



Industry has also seen a large drop in emissions (30% between 2005 and 2022), but this pace is expected to slow between now and 2030. While this has primarily been driven by low-hanging fruit like process- and energy-efficiency improvements, there is also a question around how much of this is due to European deindustrialisation – in which case, how much of this reduction has come at the expense of European competitiveness. The slowing of industrial decarbonisation illustrates that this next phase will be significantly more difficult. Moving forward, and especially as Europe looks to regain its industrial edge, Europe should build on the strong foundations of the forthcoming CBAM to actively support key industries to decarbonise (e.g., through derisking and/or procurement/offtake agreements), with investment decisions being realised this decade.



Buildings emissions have dropped nearly 30% since 2005, primarily through building renovations, improved appliance efficiency, and electrification. Consumer behaviour has also shifted significantly with over 75% of households across Europe, motivated by the substantial increase in energy prices and heightened awareness of the energy crisis, reporting that they have actively adopted measures to reduce energy consumption.⁵ Continued decarbonisation needs to focus on the electrification of heat, but the stalling or weakening of key initiatives, such as the Energy Taxation Directive and the Heat Pump Action Plan, could derail this and has already resulted in lower heat pump sales this year compared to those in 2023.

⁵ Eurobarometer (2024), *European's attitudes towards energy policies*, available at https://energy.ec.europa.eu/data-and-analysis/eurobarometers-energy_en.



Transportation has been slow to decarbonise thus far (only 5% between 2005 and 2022), despite significant vehicle efficiency improvements. As electric vehicles (EVs) start to dominate sales, transport is expected to drop another 14 pp by 2030,⁶ falling short of the 23% reduction needed for the Fit-For-55 scheme. This implies two things:

- Electrification of road transportation has started to reach a tipping point and is expected to increase, especially with the commitment to ban internal combustion engine (ICE) vehicle sales by 2035. However, the potential re-opening of this debate, with a view to delaying or diluting targets, risks damaging EU competitiveness in EVs.
- In shipping and aviation, current plans and mandates are relatively small and will not have much impact by 2030. But doubling down on mandates for 2030 can build the foundations for more rapid decarbonisation of these sectors in the 2030s and 40s.

Achieving future decarbonisation in the EU will require a significant increase in funding, a need that is not yet being met. Total low-carbon finance in the EU must nearly double to meet climate targets: even the most conservative estimates suggest that annual low-carbon investments must rise from around €330 billion in 2022 to at least €530 billion by 2030.⁷ The investment gap is particularly pronounced in specific sectors, with annual shortfalls of €95 billion for transitioning the passenger vehicle fleet to EVs, €74 billion for onshore and offshore wind generation, €52 billion for retrofitting residential buildings, and €42 billion each for non-residential building upgrades and expanding the EU's electricity grids.⁸

The situation is further complicated by the fact that while the majority of funds must come from the private sector, investor confidence in EU low-carbon projects is waning. This is due to uncertainty around EU policy and, at times, slow Member State implementation even when policy is clear. Although EU public funds rival the scale of the U.S. Inflation Reduction Act (IRA), their slow disbursement due to administrative hurdles has hampered progress. As a result, there is ongoing debate over whether additional subsidies are needed or if more effective policies and coordination of existing funds could close the investment gap.

Lastly, uncertainty around clean energy supply chains, including through tariffs and state support mechanisms, risks the EU missing out from some of the economic benefits of the transition.

3. State of the global transition and implications for the EU

Globally, technological progress – particularly in solar, wind, and batteries – means low-carbon technologies can deliver clean electricity and transport at the same cost as fossil fuels. The transition is accelerating, and many clean energy technologies have scaled faster than previously anticipated.⁹ This is the result of both significant cost declines and rising performance:

- The global average price of silicon cells, the building blocks of solar panels, fell by 92% between 2011 and 2023, and by 60% between 2020–2023 alone.¹⁰
- The price of onshore wind turbines decreased by one third between H1 2010 and H1 2023, even with a slight increase in price from 2020 levels resulting from supply chain constraints.¹¹
- The average battery pack price for EVs fell by 87% between 2011 and 2023 whilst energy density doubled over the same period.^{12 13}
- In July of this year, China automakers passed the point of EV price parity with ICEs, meaning that both the cost of purchase and total cost of ownership for EVs are cheaper than ICE vehicles.¹⁴

⁶ European Environment Agency (2023), *Trends and Projections in Europe 2023*.

⁷ ETC (2024), *Financing the Energy Transition in the EU*.

⁸ I4CE (2024), *European Climate Investment Deficit report: an investment pathway for Europe's future*.

⁹ Since 2020, the annual rate of wind and solar capacity additions has more than doubled in the EU, and more than tripled in China. See BloombergNEF (2024), *Online Explorer: solar and wind short-term forecast*. In Europe and China, for example, EVs now make up respectively one out of four and one out of three new vehicle sales. See BloombergNEF (2023), *Long-term Electric Vehicle Outlook*.

¹⁰ In parallel, global average silicon module efficiency increased from ~18% to ~24% between 2011 and 2023. See BloombergNEF (2024), *Interactive data tool – Solar spot price index*.

¹¹ Note: On a per MW-basis, including installation costs; costs have increased by 9% in H1 2023 compared to H1 2020. See BloombergNEF (2023), *Global Wind Market Outlook 2H 2023*.

¹² BloombergNEF (2023), *Lithium-Ion Battery Price Survey*.

¹³ BloombergNEF (2023), *Long-term Electric Vehicle Outlook*.

¹⁴ Bloomberg UK Newsletter (2024), *China's Batteries Are Now Cheap Enough to Power Huge Shifts*.

Accelerations in deployment and cost reductions of key low-carbon technologies can largely be attributed to industry responding to strong government ambition in key markets (backed by policies). Past performance is not indicative of future results, but there are clear signs that the progress witnessed over the last decade will continue, and even accelerate.

- In particular, annual solar PV installations are forecasted to more than double by 2030, from 440 GW in 2023 to 890 GW, bringing cumulative installed capacity to 6,760 GW.¹⁵
- Annual wind installations are expected to increase by over 40% by 2030, from 120 GW in 2023 to 170 GW, bringing cumulative installed capacity to 1,950 GW.¹⁶
- Annual sales of EVs are estimated to more than triple by 2035, from 18 million in 2023 to 60 million.¹⁷

Though the EU was an early leader in many of these areas, without focus it risks lagging behind other key regions:



In China – an economy of similar GDP – the pace of clean energy deployment far surpasses Europe's. In the first half of 2024 alone, China installed over 100 GW of solar capacity, compared to the 62 GW expected for the entire year in the EU. Moreover, China has made EVs more accessible, with EV sales accounting for over 45% of the market, and leading brands like BYD and Geely providing family-sized vehicles at the same purchase price as fossil-fuelled alternatives. China has also become the clean technology manufacturer for the world – with majority market shares in key areas such as solar PV (85%), EV batteries (76%), EVs (54%), and critical mineral processing (85%).¹⁸



The United States' Inflation Reduction Act stands as a leading global example of comprehensive incentives, covering everything from clean hydrogen and carbon capture technologies to renewable energy and EVs, as well as firm incentives for domestic manufacturing. The first two years have shown how a strong incentives package can advance the energy transition and bolster industrial sectors. While the recent election of Donald Trump indicates that it may not remain intact for much longer, its prominence in Republican states means that it may not fully be repealed.



In India, increasing focus is being paid to deploying renewables alongside storage (e.g., through sophisticated contract and auctioning mechanisms), the production and use of low-carbon hydrogen in hard-to-abate sectors, as well as domestic clean energy manufacturing. While this last effort addresses supply chain concerns, the extent to which this could increase the cost or slow the pace of India's transition remains to be seen.

Looking across this, two key themes stand out:

- **Electrification** is happening at pace and we are increasingly confident that electrification will go even further at the global level.¹⁹ China is already the world's most electrified major economy. Accelerating it in Europe will mean a commitment to long-term targets, allowing industry to respond (e.g., ICE ban in 2035 gives auto industry 10 years to pivot to EV production). Achieving electrification in Europe will require a focus on ensuring fair pricing mechanisms and smooth system integration.
- **Trade.** Although China is the largest and lowest-cost supplier of clean energy technologies (solar, batteries), countries and regions are moving to restrict its use. Similarly, moves to decarbonise heavy industry – such as through carbon pricing – are being pursued through a global "releveling" of the playing field (e.g., via CBAM, and other countries' response).

¹⁵ BloombergNEF (2024), *Online Explorer: solar short-term forecast (Mid scenario)*.

¹⁶ BloombergNEF (2024), *Online Explorer: wind short-term forecast*.

¹⁷ BloombergNEF (2023), *Long-term Electric Vehicle Outlook*.

¹⁸ ETC (2023), *Better, Faster, Cleaner: Securing clean energy technology supply chains*.

¹⁹ From around 20% today to over 60% by 2050. ETC (2023), *Fossil Fuels in Transition*.

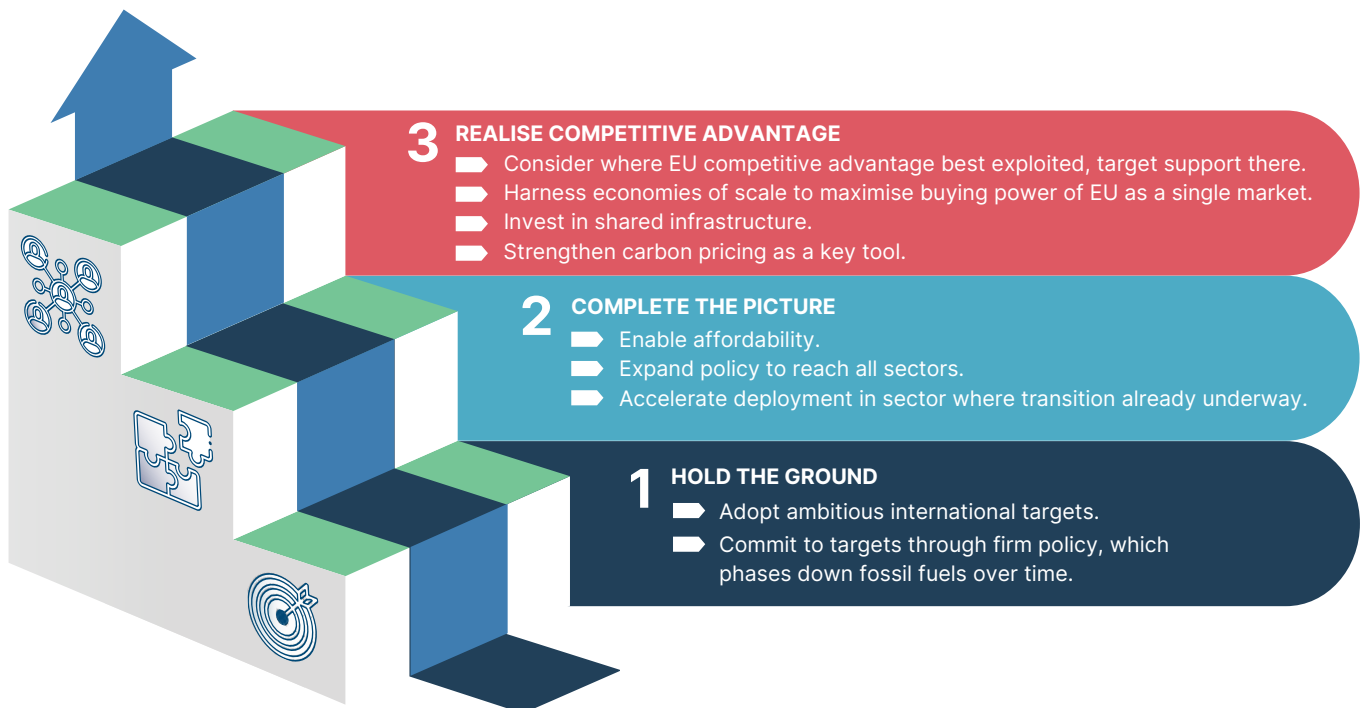
B. Key focus areas and recommendations for Europe's energy transition

The next legislative term will take us to 2030, now is the time for proper Member State implementation and to focus on policy areas that are lagging behind due to political or technical complexity. While policies like the EU ETS, REPowerEU, and Nationally Determined Contributions (NDCs) have driven significant progress, challenges remain in securing necessary funding, managing supply chains, and phasing out fossil fuels. The ETC therefore offers the following recommendations to shape the next five-year agenda of the European Commission [Exhibit 2]:

- 1. Hold the ground:** Avoid reversing previously policies to send clear market signals that will encourage investment and maintain momentum around the energy transition.
- 2. Complete the picture:** Expand policy focus to areas beyond the power sector to ensure emissions reductions is achieved across all sectors.
- 3. Realise competitive advantage:** Align industrial policy with environmental goals to ensure European companies can compete in the global marketplace

Key focus areas and recommendations for the European Commission's next five-year agenda

Exhibit 2



1. Hold the ground

As the energy transition progresses, arguments – and indeed misinformation – around the costs of the transition, or the feasibility of transition milestones are being raised. But the core facts remain the same: the transition is not costless – many estimates suggest costs of around 0.5–1% of GDP,²⁰ but the falling costs of clean energy technologies, as noted above, mean the transition is increasingly lower cost and the global energy transition is now a certainty. Failure to move in line with global trends, will damage both emissions and investment.

In a rapidly changing global landscape, mixed signals risk slowing progress. Investors and citizens require certainty in order to deliver the transition. Key areas of uncertainty currently include:

- **Policy shifts**, like the re-opening of a debate around the 2035 internal combustion engine sales ban or the stalling or weakening of key EU packages (e.g., Energy Taxation Directive or Heat Pump Action Plan), are derailing investments. For those companies in the EU that have already made billions of investments toward their own decarbonisation pathways, backsliding now will put them at a disadvantage. For companies looking to invest, uncertainty acts as a deterrent.

²⁰ ETC (2023), *Financing the Transition*.

- Without a clear plan for phasing down **fossil fuels**, EU policies have been sending mixed signals to the market. While the EU has set ambitious targets for reducing energy demand and decarbonising sectors like power, industry, transport, and buildings, it continues to support new fossil fuel infrastructure and remains reliant on Russian gas through Ukraine. For example, 70% of the growth in US oil production between 2021 and 2022 was directed toward Europe, and new LNG terminals are being approved, likely leading to overcapacity of storage. Additionally, between 2021 and 2024, at least six EU Member States have pushed back their previously announced coal phase-out dates and four have yet to announce any official phase out decision.²¹
- Debates about the **pace of EU emissions reductions** (e.g., by 2040) add further long-term uncertainty.

While watering down short-term targets might ostensibly ease the pressure on incumbents, it could actually lead to these incumbents becoming irrelevant even faster and more drastically in the near future. Rather, Europe should continue to set ambitious sustainability goals and continue to lead the world in climate action.

Key recommendations

➤ Adopt ambitious international targets.

- Adopt the proposed 2040 target for 90% emissions reduction, and use this to bring forward a world-leading NDC ahead of COP30.²²
- Rapidly scale up EU contributions to the New Collective Quantified Goal (NCQG) on finance for 2035 and encourage other high-income countries to do the same.

➤ Commit to targets through firm policy, which phases down fossil fuels over time.

- Reform tariff structure and energy taxation frameworks which still favour fossil fuel over electricity use. The revision of the Energy Taxation Directive should be a priority for the incoming Commission.
- Set clear targets for medium- and long-term deployment growth of renewables capacity (i.e. to 2035 and beyond), supported by a pre-defined schedule of government-backed auctions at the Member State level.
- Maintain currently agreed-upon timelines for decarbonising transport:
 - **Passenger cars:** Falling battery costs and improved innovation mean EVs are now available for purchase in China at the same cost as ICEs. This trend indicates that the global direction of travel and momentum must be maintained: do not delay manufacture sales mandates for 2025 or the 2035 sales ban of ICEs; and solely promote the use of EVs for passenger transportation by removing carve out for the e-fuels.
 - **Aviation and shipping:** Commit to and stand by targets for blending of low-carbon fuels into these sectors on 2030/35 timeframes.
- Commit to decarbonisation of buildings: Set a clear date to ban the sale of fossil fuel boilers and to end the use of fossil fuel boilers, as initially outlined in the Energy Performance of Buildings Directive, and establish more ambitious minimum energy performance standards for household technology and appliances.
- Signal to Member States the need to create comprehensive phase-down plans for gas networks to ensure maintenance costs are minimised and do not penalise households that do not immediately electrify or cannot afford to electrify.

2. Complete the picture

As noted above, progress in Europe risks lagging behind other key regions. Emissions reductions have largely been due to Europe's focus on clean power and efficiency. This focus must now shift to ensure emissions reductions continue to be realised across all sectors.

- **Power:** Given the inevitable electrification of so many end-uses (transport, buildings, much of industry), delivering a zero-carbon electricity system by 2035 is crucial. This system will not just be a decarbonised version of what currently exists, but a significantly larger and sophisticated one – one that requires new physical infrastructure (grids, interconnections, long-duration storage) as well as market mechanisms to ensure cost-effective transmission of electrons and encourage flexibility.
- **Industry:** Bold ambition is being signalled outside of the power sector, such as in clean hydrogen and carbon capture, but the lack of firm derisking and offtake mechanisms means industry won't commit. Europe lags behind the US in these sectors. Public (and private) procurement will be a key lever. Beyond this, public balance sheets may be required for additional de-risking, and in some cases first of a kind subsidy.

²¹ Beyond Fossil Fuels (2024), *Europe's Coal Exit*, available at: <https://beyondfossilfuels.org/europes-coal-exit/>.

²² For further detail, see ETC (2024), *Credible Contributions: Bolder Plans for Higher Climate Ambition in the Next Round of NDCs*.

- **Buildings:** ETC analysis has shown that significant energy savings for heating can be achieved by switching to a heat pump without needing to improve insulation. However, many households cannot yet afford to switch and for those that can, a shortage of skilled labourers has created a backlog of installations. Thus, in addition to enforcing policies which phase down fossil fuels, building decarbonisation will require training and deployment of skilled labour and financial support for low-income households.
- **Transport:** The transport sector has been the slowest to decarbonise and is now the largest source of emissions in the EU. Despite the recent uptake of EVs and future EV sales mandates, further deployment of charging infrastructure in some Member States is needed to achieve the pace of road decarbonisation seen in other geographies. Aviation and shipping, which have yet to see much change, require more regulatory certainty to create a foundation that will support rapid progress after 2030.

Coming out of these individual sectors are cross cutting themes to ensure implementation is done in a fair way that brings all citizens and consumers along in the transition. Key areas of focus include:

- **Ensuring Member State implementation.** While targets may be set by the EU, action is done by the Member States. Though European principles are often adopted, action towards them (and related enforcement) often underperforms.²³ In many cases, sharing of best practice – such as planning simplification, or short-term exemption measures²⁴ – can accelerate progress at no additional cost.
- **Fairness in pricing mechanisms.** Such as ensuring the extension of carbon pricing (via the incoming ETS2) to transportation and buildings sectors doesn't leave low-income households exposed to increased costs they aren't able to avoid. Similarly, many pricing mechanisms either disfavour electrification or don't allow the benefits of cheap low-carbon electricity to be passed through to consumers.

Key recommendations

Accelerate deployment in sectors where transition already well underway.

- **Overall:** Address political and social bottlenecks to the energy transition through industry and townhall dialogues (e.g., social awareness of heat pumps, the need for grid build-out). Be honest and up front about any potential adverse impacts (e.g., by acknowledging that the transition in some sectors comes at a cost), but communicate actions the government is taking to minimise these.
 - For sectors experiencing an overcapacity of workers (e.g., automakers), enact measures to help reskill workers and deploy them in sectors that are in dire need of skilled workers (e.g., grids, heat pumps, etc.).
- **Power:** Supporting Member States in administrative delivery of the energy transition. This includes:
 - Developing comprehensive long-term planning and anticipatory investment models for grids that is aligned between transmission and distribution, both within Member States and cross-country; and streamlining planning and permitting of both grids and power generation, including through one-stop-shops and digitalisation.²⁵
 - Designing government auctions and contracts to increase the certainty that contracted volumes of renewable generation capacity will be delivered (e.g., by reducing optionality around delivery).
 - Addressing supply chain gaps via forward planning, contracting and buying in bulk, and training staff in advance (e.g., HVDC cables and skilled grid workers).
- **Transport:** Plan and install EV charging infrastructure to address consumer range anxiety and further drive EV adoption.

Enable affordability.

- **Power:** Increase the use of two-way contracts for difference (CfDs) in the power sector, as per the Draghi recommendation, increasing periods where the true cost of generating electricity is actively reflected in the price – and not just reflecting the marginal cost of fossil fuel.
- **Power:** Encourage electricity network pricing mechanisms that favour expansion and optimisation of electricity networks, whilst safeguarding vulnerable consumers. Within this, consider how network pricing affects potential uptake of electrification solutions (e.g., thermal electricity storage for industrial heat)²⁶ and whether additional specific reforms may be required.

²³ E.g., although permitting timelines for wind and solar farms should be limited to two years, only three of EU27 met this for solar, and no Member States for wind.

²⁴ Such as Spain's use of the "rule of positive silence" to speed environmental permitting. For further best practice examples, see ETC (2023), [Streamlining planning and permitting to accelerate wind and solar deployment](#).

²⁵ ETC (2024), [Building grids faster: the backbone of the energy transition](#).

²⁶ See Systemiq (2024), [Catalysing the Global Opportunity for Electrothermal Energy Storage](#).

- **Buildings:** Target financial incentives at low-income households where citizens must invest in decarbonisation – like tax breaks, grants, and subsidised loans to encourage citizens to invest in energy-efficient renovations, heat pumps, etc.
- **Transport:** Considering that not all households have the ability to install home chargers, ensure that street-charging is available at a similar price to at-home charging.²⁷

➤ Expand policy to reach all sectors.

- **Power and Industry:** Provide clear rules and incentives for Carbon Capture Utilisation and Storage (CCUS) deployment, including CO₂ storage permitting, liability frameworks, and financial support mechanisms.
- **Industry:** Set up auctions-as-a-service (e.g., the European Hydrogen Bank, German Carbon Contracts for Difference) across Member States, including provision of funding at EU or Member State level.
- **Industry:** Provide certification for green hydrogen and renewable fuels of non-biological origin to enable formation of high integrity market.²⁸
- **Industry:** Expand offtake and ensure adequate demand for low carbon goods (e.g., steel, ammonia) through direct public procurement, green “market maker” mechanisms,²⁹ and product mandates (e.g., required minimum (%) of green metals to be used in vehicles).

3. Realise competitive advantage

There is a risk that global environmental goals clash with local and regional trade and industrial policy. Whereas the global goal should be to ensure a low-cost clean energy transition that maximises economic opportunities, current policy implementation risks hampering many of these objectives. For instance, the EU’s anti-subsidy investigation into Chinese EVs has resulted in additional tariffs, whilst efforts to build up domestic clean energy manufacturing — primarily through grants — are hindered by unclear and hard-to-access funding processes. Often, state level support for industries in other geographies is no different to support the EU has given to prior industries (e.g., solar PV).

Separately, misconceptions around energy security present clean energy technology risks on the same footing as fossil fuels. For example, while critics point to Europe’s increasing reliance on Chinese-manufactured solar and wind technologies, it’s important to note a key difference between renewables and fossil fuels: once installed, solar panels and wind turbines generate power without requiring a continuous fuel supply, unlike natural gas, which depends on constant imports. The EU’s decisive move away from natural gas was driven by the Russian invasion of Ukraine. Here over-reliance on a single supplier led to supply shortages and price spikes driven by fossil fuels, not clean energy, and ultimately Europe’s response (increasing efficiency and renewables) has increased Europe’s energy security.³⁰

Across both fossil and clean, sole reliance on a single supplier poses risks, albeit different ones. The goal of the EU should therefore be appropriate diversification, whilst maximising both a low-cost clean energy transition and expanding competitive advantage into targeted areas. Existing regulations, such as the incoming CBAM,³¹ pioneer a foundation for future trade models based on fair low-carbon competition which promotes global industrial decarbonisation, not protectionism. The world should embrace this model and neither Europe nor other countries should tolerate competition based on higher carbon emissions.

However, Europe must also be honest with itself. As technology costs continue to fall – particularly renewables and batteries – certain industries (e.g., iron making, chemicals production) are likely to locate in geographies which offer the best renewable resource, and by proxy cheapest energy. A relentless focus on reducing electricity costs can help limit the damage, but ultimately many of these locations will be outside of Europe. Identifying and recognising where these shifts are unavoidable will allow the EU to make overt plans that anticipate rather than delay the inevitable.

Honesty here will allow Europe to focus on areas where genuine competitive advantage can be found, as the recent Draghi report recognises. For example relentless competition and cost reduction in solar PV from Chinese manufacturers suggest there is limited merit in supporting solar manufacturing in Europe where imports from China pose limited energy security concerns, and current EU employment in this space is almost none. On the other hand, targeted support to manufacture EVs (and batteries, which benefit from co-location next to EV assembly) in Europe would prioritise focus on a sector where there is already a large number of skilled auto workers.

²⁷ Depending on the location, street-charging for an EV can be 2–3x more expensive than charging at home. European Commission (2024), *Alternative Fuels Observatory*, available at <https://alternative-fuels-observatory.ec.europa.eu/consumer-portal/electric-vehicle-recharging-prices>.

²⁸ While the EU delegated act on lower-carbon hydrogen defines low-carbon fuels, there is no official method for certifying these fuels. The EU should either adopt the methodology of existing third-party certifiers or publish its own methodology.

²⁹ An example here would be H2 Global.

³⁰ ETC (2022), *Building Energy Security Through Accelerated Energy Transition*.

³¹ And extension of these principles in the Batteries Regulation.

Onshoring everything would increase the cost of the transition to European consumers. But Europe has an opportunity to be a leader in subsets of clean technology and can boost its competitiveness while driving export growth. To do this, Europe must align industrial policy with environmental goals to create an environment where companies can innovate and scale their green technologies globally.

Key recommendations

➤ Consider where EU competitive advantage is best exploited, and target support there.

- Identify the subset of key clean technology industries where the EU has a competitive advantage and seek to develop local manufacturing capacity.³²
- Potential industries could include EVs and batteries, offshore wind, PEM electrolyzers, heat pumps, HVDC cables, and specific grid components (e.g., large scale transformers).
- Follow fact-based approach to unfair competition concerns and welcome foreign products where there are no local substitutes at a good price, or where low cost is particularly important at this stage of the transition (e.g., solar panels).
- Welcome inward investment, including through foreign ownership of manufacturing (e.g., EVs): Location, not ownership, drives investments, jobs, and technology transfers.
- Where appropriate, deploy time-bound subsidies to build local industries, not permanent tariffs: Permanently protecting structurally higher-cost industries increases consumer costs and slows energy transition.³³

➤ Harness economies of scale to maximise the buying power of the EU as a single market.

- Set (or reinforce) ambitious sector specific targets for clean technology scale up into the 2030s (e.g., solar power, wind power, green hydrogen) and ensure these are reflected at the Member State level.
- Harmonise technical standards for renewable technologies (e.g., wind turbine components) to take advantage of economies of scale and reduce costs. Consider expanding national level local content requirements to a wider pool of EU providers.
- Continue to increase regional cooperation, particularly in the context of offshore wind in the North Sea and Baltic, where capacity is likely to be shared. This could increase competition for renewable energy and storage and flexibility.

➤ Invest in shared infrastructure.

- Rapidly scale up investment in electricity grids via a targeted fund/financing mechanism, outside of funding for gas/CCUS (currently most infrastructure competes for the TEN-E fund³⁴).
- Co-ordinate and deliver key shared infrastructure assets required for the transition, including hydrogen and CO₂ transport networks and storage infrastructure, and cross-border electricity transmission.
- Reduce differences in national regulations that create barriers to cross-border electricity trade within the EU (e.g., market rules and pricing mechanisms, grid access and capacity allocation, licensing and permitting processes).

➤ Strengthen carbon pricing as a key tool.

- Double down on CBAM as a pioneering policy tool that promotes competition based on low emissions, rather than protectionism.
- Expand CBAM to include export rebates as a way to prevent EU companies from moving operations from Europe to areas that do not have strict carbon pricing.
- Consider the smart extension of carbon pricing to other sectors (e.g., beyond ETS2, or for example, including embodied carbon limits in building regulations) and longer-term inclusion of carbon dioxide removal (CDR) mechanisms in the ETS.
- Focus on messaging and outreach to global community to explain that the CBAM is not a protectionary measure; share best practices with other geographies as they plan and implement their own carbon pricing schemes.

³² See ETC (2023), *Supply chains: EU policy toolkit*.

³³ See Systemiq (2024), *Cleantech Reality Check*.

³⁴ The Trans-European Networks for Energy (TEN-E) is a European Union (EU) policy that funds and facilitates cross-border energy infrastructure projects. European Commission (2024), *Trans-European Networks for Energy*, available at https://energy.ec.europa.eu/topics/infrastructure/trans-european-networks-energy_en

Related and relevant publications

For additional insights into sector recommendations at the global level, please look for:

- ETC (2024), *Building grids faster: the backbone of the energy transition*.
- ETC (2023), *Fossil Fuels in Transition*.
- ETC (2023), *Better, Faster, Cleaner: Securing clean energy technology supply chains*.
- ETC (2022), *Building Energy Security Through Accelerated Energy Transition*.

In addition to what has been covered here, forthcoming work produced by Systemiq and Breakthrough Energy will provide deep dives into individual sectors for specific recommendations on how Europe can continue or accelerate the transition within those sectors. Please look for:

- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Aviation*
- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Maritime*
- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Green Hydrogen for Refineries*
- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Grids*
- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Heat Electrification*
- Systemiq/Breakthrough Energy (2024), *Cleantech Reality Check - Long Duration Battery Storage*
- Systemiq/Breakthrough Energy (2024), *EU Critical Raw Material Supply-side Innovation Roadmap*

And for a broader scope of insights for the European transition, we recommend *The Green Deal and Beyond: A Business Agenda for a Sustainable, Competitive and Resilient Europe* by Cambridge Institute for Sustainability Leadership (CISL) published earlier this year.



The Energy Transitions Commission is hosted by SYSTEMIQ Ltd. Copyright © 2024 SYSTEMIQ Ltd. All rights reserved.

Design by Dotlab